

In re Appln. of Brian Christian Orr et al.
Serial No. 10/028,242
Reply To Office Action Of May 19, 2004

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of the claims in the application:

LISTING OF THE CLAIMS

1. (PREVIOUSLY PRESENTED) A differential casing comprising:

a chamber having an axle centerline, a centerpoint, and defined by at least one spherical surface and at least one opposing surface, wherein a centerpoint of said at least one spherical surface is substantially collinear with said axle centerline and is offset from the centerpoint of said chamber by an offset distance along said axle centerline in a direction away from said opposing surface such that said at least one spherical surface is closer to said centerpoint of said at least one spherical surface than said chamber centerpoint.

2. (ORIGINAL) A differential casing as in claim 1 wherein the ratio of the radius of said at least one spherical surface to said offset distance is at 30.

3. (CURRENTLY AMENDED) An automotive differential mechanism comprising:
 - (a) a first side gear having a spherical centerpoint;
 - (b) a second side gear having a surface; and
 - (c) a differential chamber having an axle centerline and a chamber centerpoint, ~~said differential chamber formed by offsetting~~ wherein the spherical centerpoint of said first side gear is offset from the chamber centerpoint in a direction substantially along said axle centerline away from the surface of said second side gear.

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4. (CURRENTLY AMENDED) An automotive differential mechanism comprising:

- (a) a pinion shaft;
- (b) a first pinion gear;
- (c) a second pinion gear;
- (d) a first side gear having a first side gear outer ~~radius~~ surface;
- (e) a second side gear having a second side gear outer ~~radius~~ surface; and,
- (f) a differential casing having an axle centerline, a casing centerpoint, a first axle shaft port, a second axle shaft port, a first inner surface defining a first inner radius; having a first radius center point, and a second inner surface defining a second inner radius having ~~and~~ a second radius center point, wherein said second radius center point is substantially collinear with said axle centerline and offset from said casing centerpoint an offset distance along said axle centerline in a direction away from said first inner ~~radius~~ surface such that when said first and second pinion gears, said pinion shaft and said first and second side gears are installed within said differential casing, said pinion gears and said pinion shaft force said first side gear outer ~~radius~~ into surface towards said first inner ~~radius~~ surface and said second side gear outer ~~radius~~ into surface towards said second inner ~~radius~~ surface such that said first side gear is substantially aligned with said first axle shaft port and said second side gear is substantially aligned with said second axle shaft port.

5. (ORIGINAL) An automotive differential mechanism according to claim 4 wherein said first and second side gears do not have alignment shoulders.

6. (PREVIOUSLY PRESENTED) A differential mechanism comprising:

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- (a) a casing adapted to be rotatably driven about an axis of rotation and having a chamber defined by walls;
- (b) a pair of pinion gears retained within said chamber rotatable about an axis of rotation normal to and having an intersection point with said axis of rotation of said casing;
- (c) a pair of side gears having a part-spherical endwall;
- (d) means for retaining said side gears from rotating within said chamber about the axis of rotation of said pinion gears including a pair of part-spherical regions defined in said chamber, each said region being defined by a wall of said chamber having a spherical shape substantially complementary to the end wall of one of said side gears and each said region providing a recess in said chamber for supporting one of said side gears;
- (e) each of said part-spherical regions comprising part of a sphere having a center located on said axis of rotation of said casing and offset from said intersecting point in a direction opposite the offset direction of the other of said part-spherical regions providing the chamber extending more in the axial direction of said casing than in the direction of the axis of rotation of said pinion gears.

7. (WITHDRAWN) A method of assembling a differential mechanism having at least one spherical side gear, two pinion gears and a pinion shaft comprising the steps of:

- (a) forming a casing with at least one spherical surface substantially complementary with a spherical surface of at least one spherical side gear;
- (b) inserting at least one spherical side gear into said casing so that said spherical side gear is held in place by virtue of contact between said at least one spherical side gear and said complementary casing spherical surface and the support provided by said two pinion gears and said pinion shaft.

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8. (PREVIOUSLY PRESENTED) The differential casing of claim 1 wherein said at least one opposing surface is spherical and has a centerpoint, and wherein said centerpoint of said at least one opposing surface is offset from the chamber centerpoint by an offset distance along said axle centerline in a direction away from the centerpoint of said at least one spherical surface.

9. (PREVIOUSLY PRESENTED) The automotive differential mechanism of claim 3 wherein said surface of said second side gear has a centerpoint offset from said chamber centerpoint in a direction away from the spherical centerpoint of the first side gear.

10. (CURRENTLY AMENDED) The automotive differential mechanism of claim 4 wherein the said first radius centerpoint is substantially collinear with said axle centerline and offset from said casing centerpoint an offset distance along said axle centerline and in a direction away from said second inner radius surface.